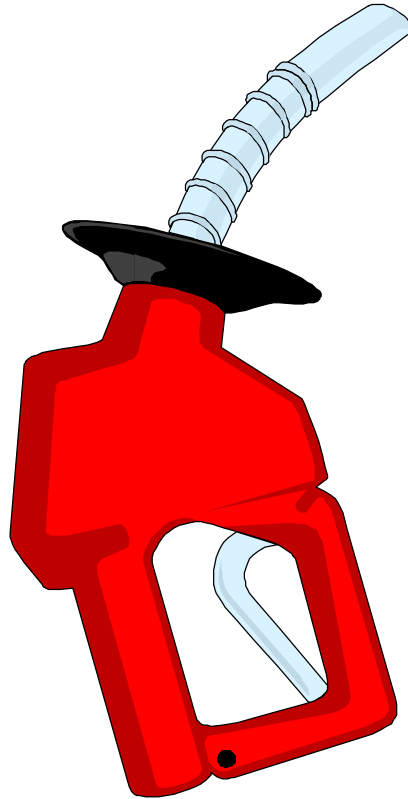
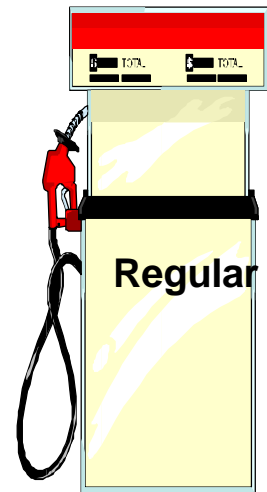
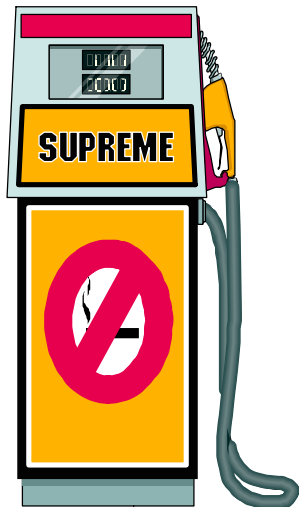


NH Stage I/II Vapor Recovery Program

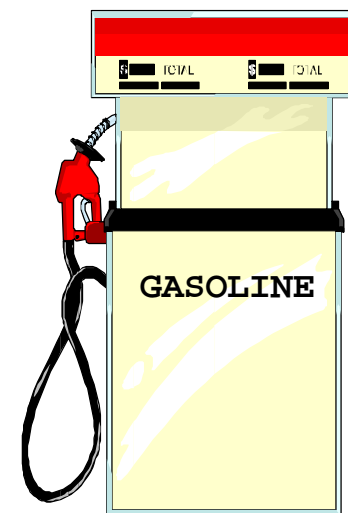


Overview of NH Gasoline Vapor Recovery Program

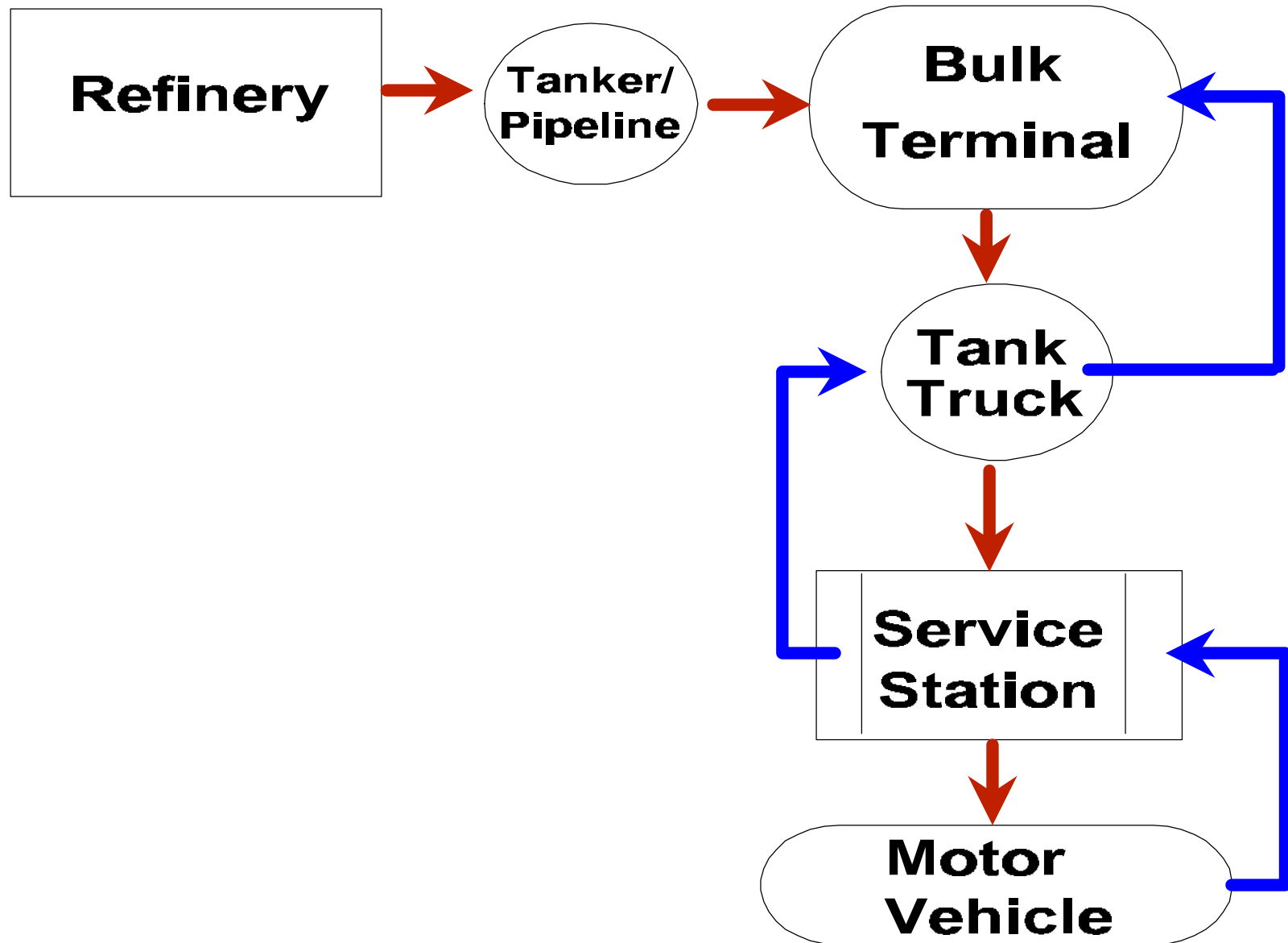


Benefits of Gasoline Vapor Recovery

- Reduces VOC emissions by up to 95%
- Reduces exposure to toxics and carcinogens



Vapor Recovery Cycle

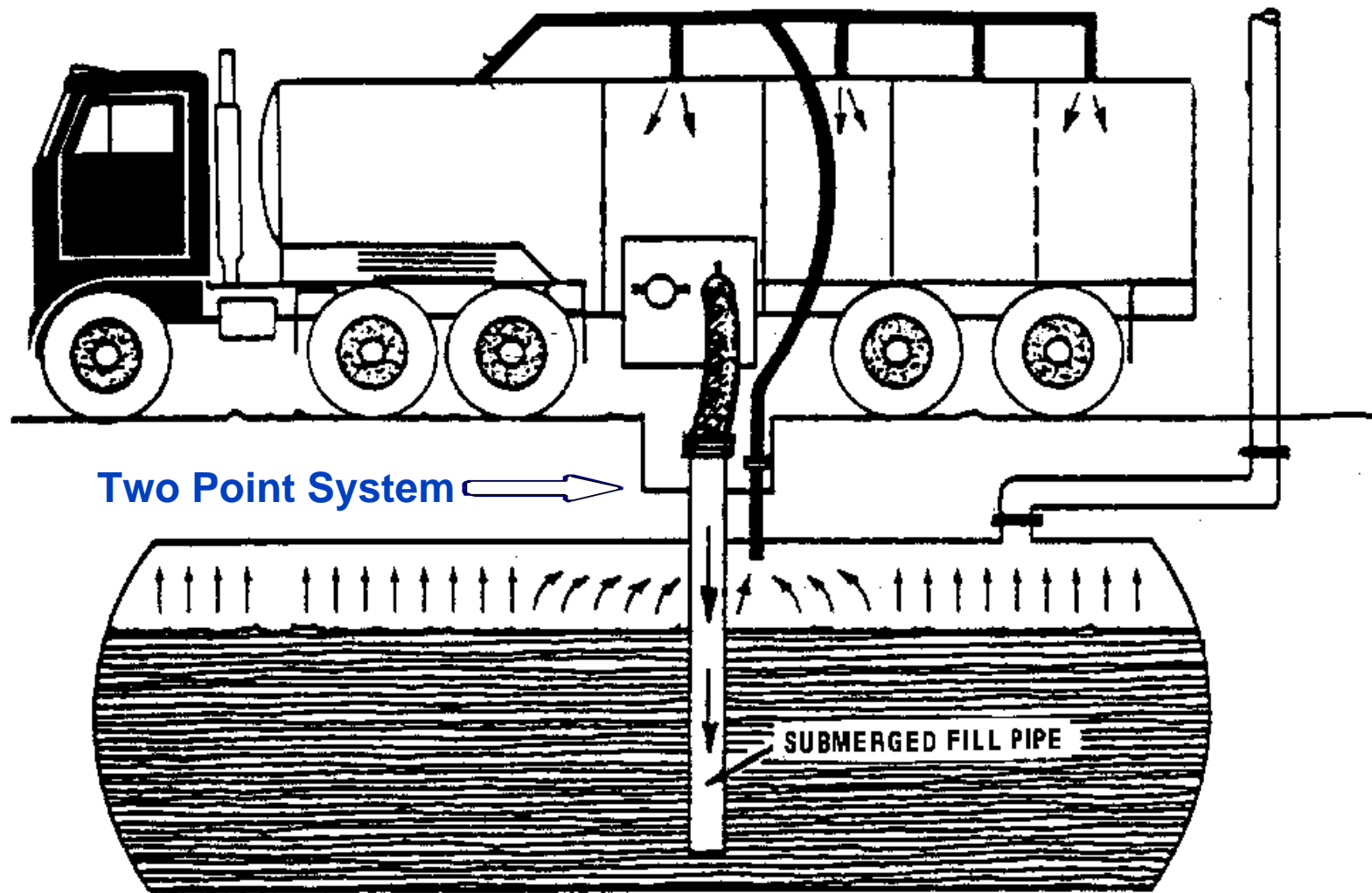


Stage I Vapor Recovery

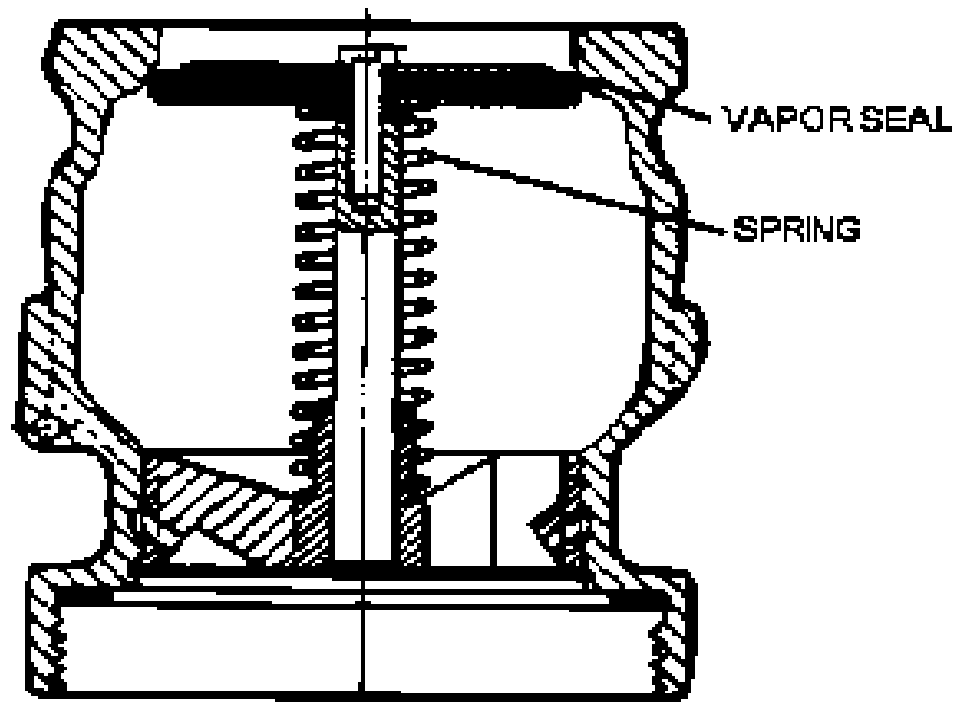
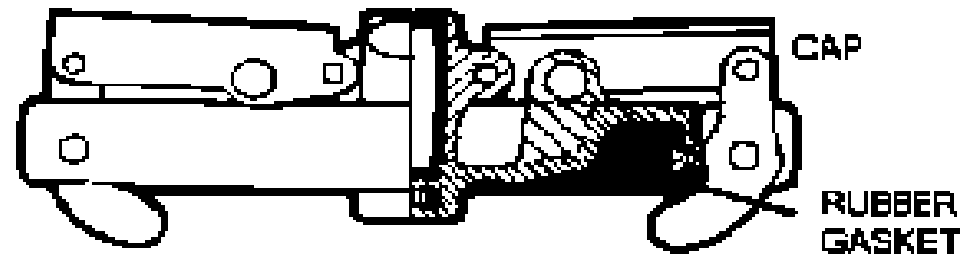
- Two Point
- Coaxial
- Teed



Vapor Collection at Station



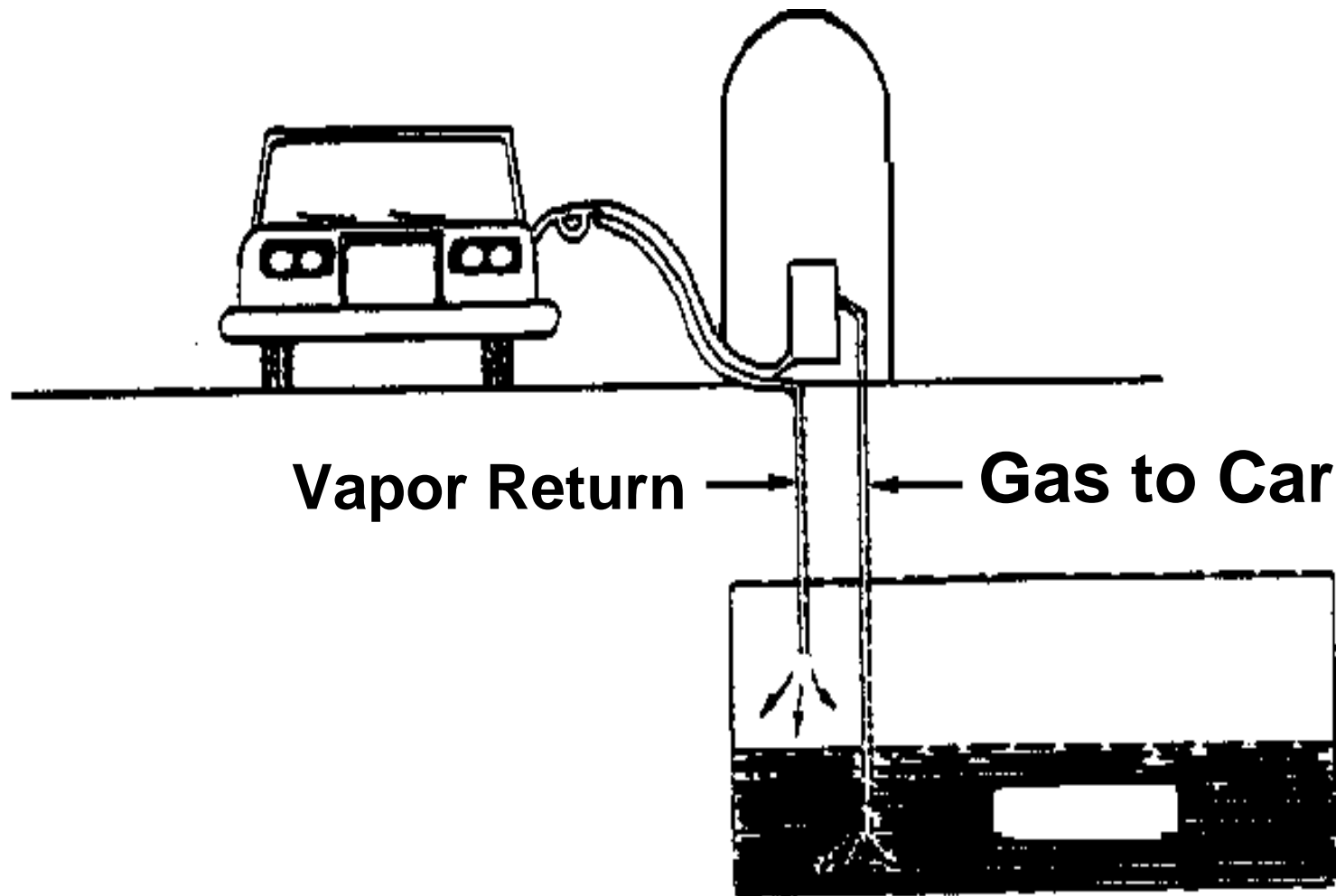
Stage I Dry Break



Stage II Vapor Recovery



Vapor Collection from Vehicle Tank



Summary

- **Stage I required on tanks 1100 gal & greater**
- **Stage I required on delivery trucks servicing eligible tanks**
- **Stage II required in Hillsboro, Merrimack, Rockingham, & Strafford Counties**
 - **Stage II only required at stations with 420,000 gal and above yearly throughput**
- **Certification required for all stations**
 - **Stage II certification requires test and is only good for up to 3 years**
 - **Stage I certifications are good until a change is made to the system**

NH Vapor Recovery Rule Changes

- **Stage I required for all tanks 1100 gal or larger**
- **Stage II testing required on three year cycle from 1993/4**
- **Stage II testing changes**
 - **Nozzle ratio testing required**
 - **Testing of Pressure Vacuum Vent Caps required**

Stage II Testing

- Pressure Decay Testing
- Back Pressure Testing
- Pressure/Vacuum Cap Test
- Nozzle Testing
- Healy System Testing

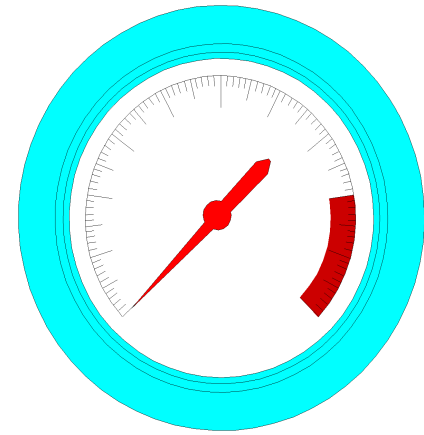


Pressure Decay Testing

- **NH requires 10" w.c. initial pressure**
- **Pressure is maintained for 5 minutes**
- **Allowable decay is determined based on tank ullage**

Common Pressure Decay Problems

- Loose fittings
 - pipe fittings
 - dry breaks
 - covers
- Leaking spill bucket plungers
- Nozzles
 - check valves
- Breakaways

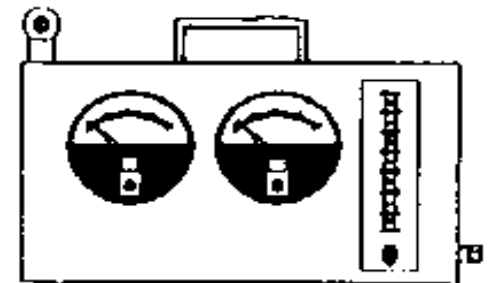


Common Pressure Decay Problems (Cont.)

- **No Drop Tube**
- **Wrong Fittings**
- **Gasoline Storage Tanks Filled Within Three Hours of Test**
- **No Testing Tees**
- **Slip On Type P/V Vent Cap on Threaded Vent Pipe**
- **Leaking Test Equipment**

Back Pressure Testing

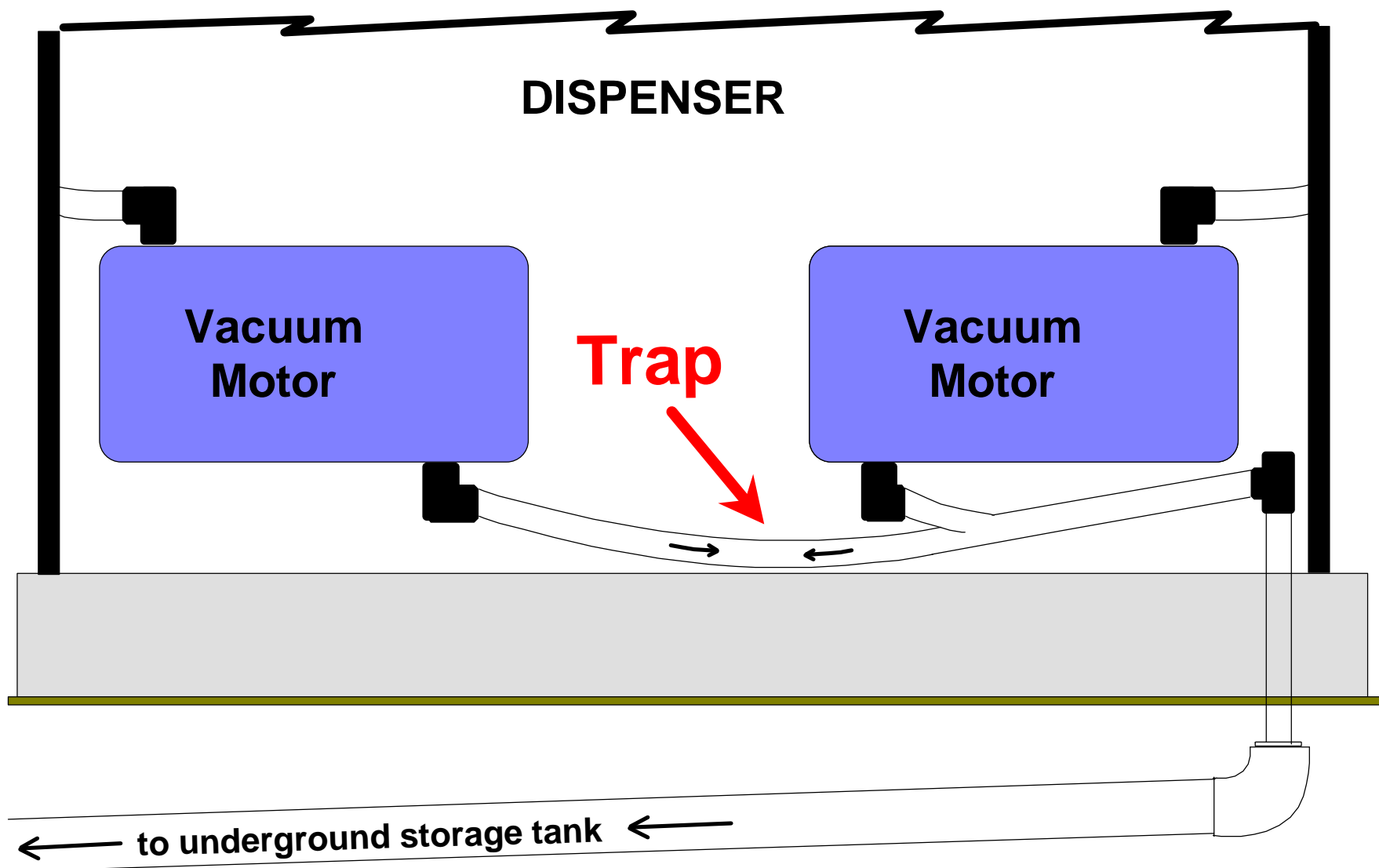
- Dry Test
 - 20,60 & 100 CFH Nitrogen
- Wet Test
 - Gasoline flow back to tank
 - 60 CFH
- Dry Break Propped Open
- Gauge Shouldn't Pulsate



Back Pressure Problems

- Liquid Traps in Vapor Return Line
- Traps in Dispenser Vapor Piping
- Dispenser Hose Not Drained
- Poor Seal on Testing Fixture

Vapor Return Piping Problems

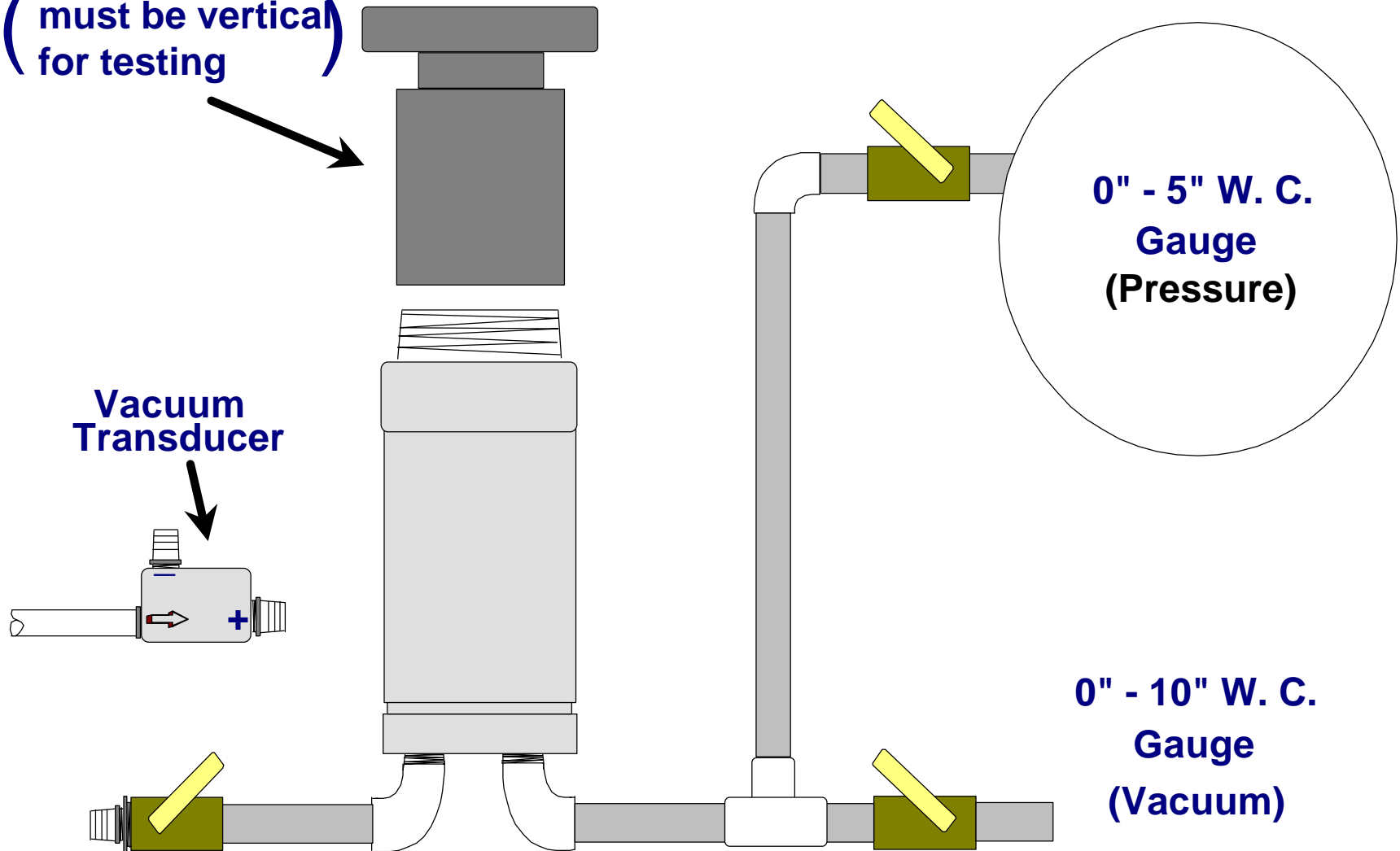


Pressure Vacuum Cap Testing

- Pressure Tested to +/- .5 w.c.**
- Vacuum Tested to +/- 2 "w.c.**
- Cap Must be Vertical**

Pressure/Vacuum Vent Cap Tester

P/V Vent Cap
(must be vertical
for testing)



Pressure Vacuum (P/V) Vent Caps

Required on all Stage I/II Systems

Stage II Vapor Recovery Systems

Pressure: 3 " w.c.

Vacuum: 8 " w.c.

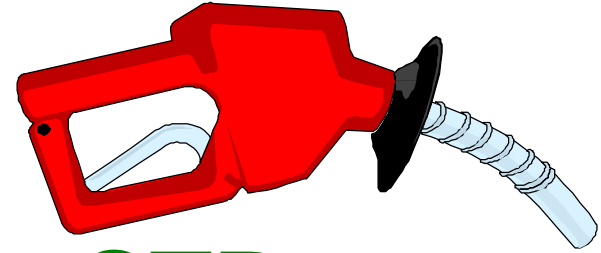
Stage I Vapor Recovery Systems

Pressure: 8 oz/square inch

Vacuum: 1/2 oz/square inch

Nozzle Ratio Testing

- Air to Liquid Ratio
 - Ratio Computed at STP
 - Flow Meter Required
 - Allowable Ratios Based on CARB Certifications
- Vapor to Liquid Ratio Testing Allowed



Nozzle Testing Problems

- Insufficient Gasoline Flow Rate
- Poorly Fitting Nozzle Sleeve
 - Sleeve Covering Vacuum Shut-off
- Flow Meter not in Calibration

Healy System Testing

- **Booted Nozzle Systems**
 - **Pressure Decay of Tank**
 - **Booted Nozzle Test**
 - **Vacuum Decay of Vapor Return**

- **Bootless Nozzle Systems (600)**
 - **Pressure Decay of Tank**
 - **Vacuum Decay of Vapor Return**
 - **A/L or V/L Nozzle Test**

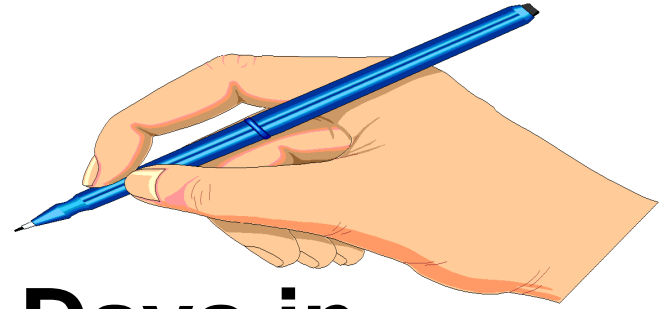
Healy System Testing Problems

- **Wrong Testing Gauges**
- **Incorrect Pump Piping**
- **Different Booted Nozzle Test**
- **Different Vacuum Decay Calculation Between Booted and Bootless Systems**

Most Commonly Found Test Problems

- Loose Fittings**
- Traps in Vapor Return Piping**
- Missing or Incorrect P/V Vent Caps**
- Malfunctioning Vapor Recovery Nozzle Systems**
- Plungers in Spill Buckets Not Sealed**
- New Work not Completed and Covered Over**

Additional Testing Issues



- **Tests Scheduled 5 Days in Advance**
- **State Required to Inspect Test**
- **Test Results to be Supplied to State**

Safety Issues



- **Caution With Vapors**
 - Fire Hazards
 - Asphyxiation



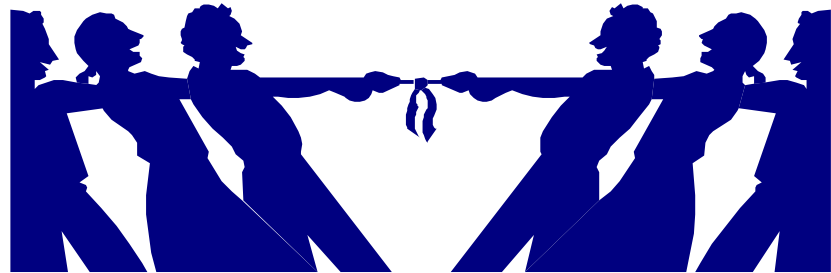
- **Use Cones and Safety Tape**
- **Ladder Use During P/V Vent Cap Removal/Installation**
- **Safety Glasses During Testing**
- **Cold & Hot Weather Extremes**

Recommended Vapor Recovery Reference Materials

- **CARB Executive Orders
/Manual**
- **PEI RP300-93 Recommended
Practices for Installation and Testing of
Vapor Recovery Systems**



Questions and Open Discussion

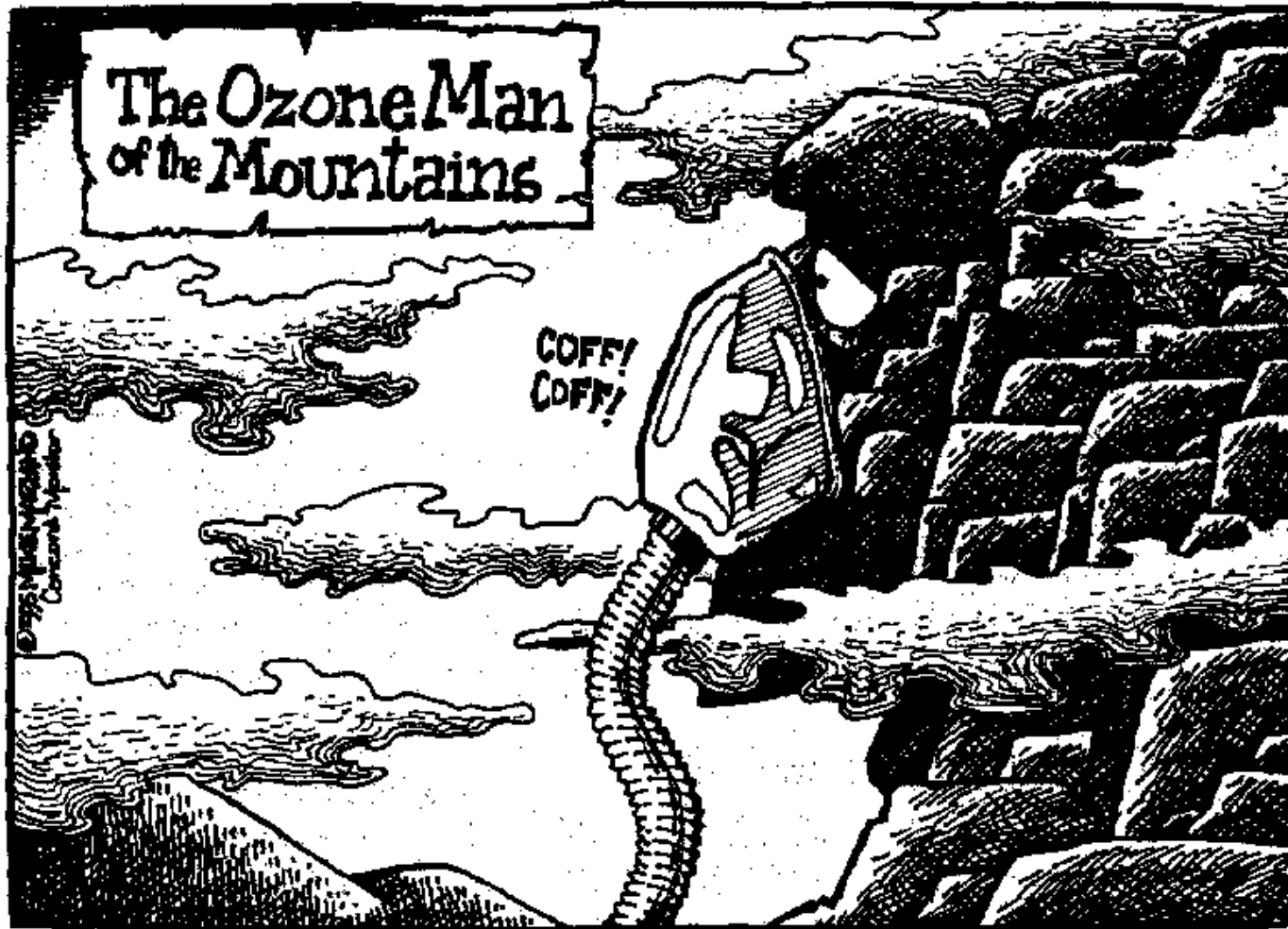


**New Hampshire
Department of
Environmental Services**

**Air Resources
Division**

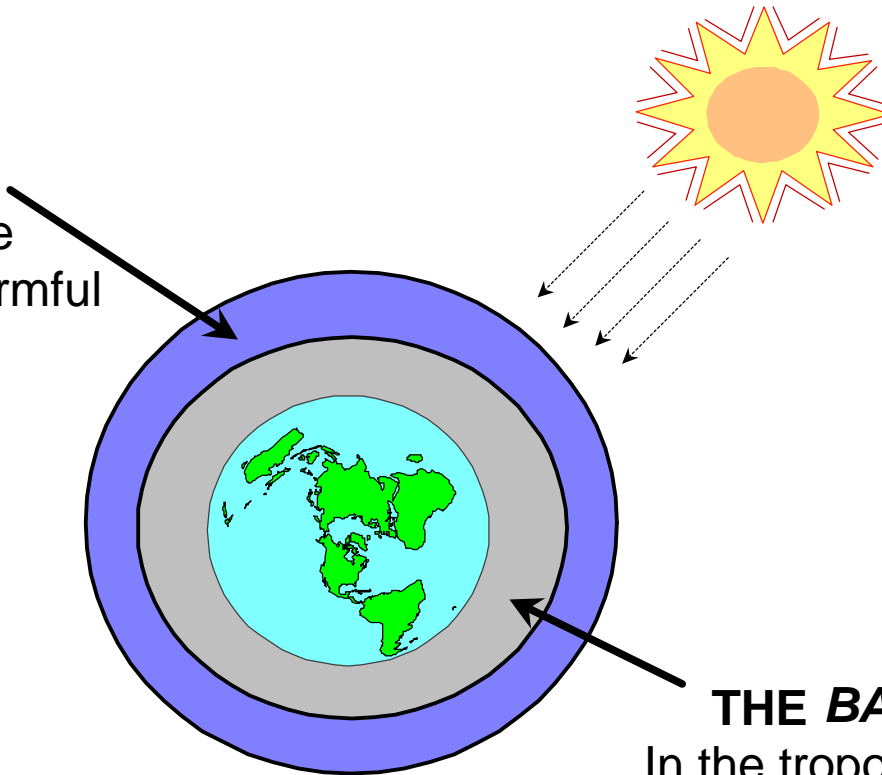
**6 Hazen Drive
Concord, NH 03302-0095**

Air Pollution Overview



There's **GOOD** Ozone and *BAD* Ozone

THE GOOD OZONE:
In the Stratosphere, ozone
protects us from the sun's harmful
ultraviolet radiation.



THE *BAD* OZONE:
In the troposphere, ozone
(ground-level) can damage
lung tissue and plants.

STRATOSPHERIC OZONE:

Occurs Naturally

**Protects the Earth from
Harmful Ultraviolet
Radiation**

TROPOSPHERIC OZONE:

**Results from Human
Activities**

**Causes Damage to Lung
Tissue and Plants**

What is *SMOG*?

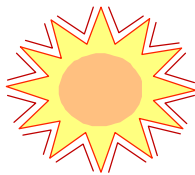
**Volatile Organic Compounds
(VOCs)
(or Hydrocarbons)**



**Nitrogen Oxides
(NO_x)**



**Ground-level Ozone:
A Noxious Pollutant**



(Heat and Sunlight)



**Carbon Monoxide (CO):
A Poisonous Gas**



Clean Air Act



NH'S STRATEGIES TO CONTROL OZONE

Industrial NO_x and VOC controls

New Motor Vehicle Standards

Use of Reformulated Gasoline (RFG)

Stage I and Stage II Vapor Recovery



Unburned Gasoline Vapors

Problems

Gasoline distribution for use in motor vehicles creates vapors

11 lbs VOC created per 1000 gallons of gasoline vapors

- Increases ozone & smog**

Hazardous Air Pollutants found in unburned gasoline vapors

- Benzene**
- Hexane**
- Toluene**
- Naphthene**
- MTBE**